WHAT IS CLAIMED IS:

1. A system for processing image data for display or printout by an output device, comprising:

a source data capturing unit for obtaining source data containing a representation in plural colors of an image, a graphic or text;

a data converter for converting color data for each pixel in the source data to luminance data for that pixel, the luminance data representing one of a plurality of luminance levels; and

a color assignment unit for assigning one of a plurality of colors that are available in the output device to each pixel according to a luminance level represented by the luminance data of that pixel.

2. The system of claim 1, wherein the color data of each pixel is represented by color intensity values of primary colors, and the data converter is adapted to convert the color data to the luminance data by weighting each color intensity value by a weighting factor assigned to that color intensity value, and summing the weighted color intensity values.

3. The system of claim 2, wherein the primary colors are red, green, and blue, and the ratio of the weighting factors is equal, or approximately equal, to R:G:B = 3:6:1 where R represents red, G represents green and B represents blue.

4. The system of claim 1, wherein the data converter comprises a luminance calculator for converting the color data for each pixel to first luminance data representing one of a first number of luminance levels, and a gray level processor for further converting the first luminance data for each pixel to second luminance data representing one of the plurality of luminance levels, the plurality being a second number smaller than the first number.

5. The system of claim 4, wherein the gray level processor comprises:

a distribution calculator for calculating a luminance distribution by counting for each luminance level of the first number the number of pixels whose corresponding luminance data represents that luminance level, and for detecting one or more luminance levels that represent local pixel count minimums in the luminance distribution; and

threshold value selecting means for setting threshold values based on the one or more minimums;

wherein the gray level processor is adapted to reduce the first number of luminance levels to the second number based on the threshold values.

6. The system of claim 5, wherein the distribution calculator is adapted to smooth the luminance distribution, and to detect the one or more minimums from the smoothed luminance distribution.

7. The system of claim 5, wherein the distribution calculator is adapted to detect the one or more minimums by scanning the luminance distribution from one of the smallest and the highest luminance level to the other one of these two luminance levels and finding one or more luminance levels at which the pixel count value starts increasing and keeps increasing for a predetermined plurality of consecutive luminance levels, after it had decreased for a predetermined plurality of consecutive luminance levels.

8. The system of claim 1, wherein the plurality of luminance levels is eight.

9. The system of claim 1, wherein the plurality of luminance levels is N, and the color assignment unit is adapted to assign to each of the N luminance levels a respective one of N available colors.

10. The system of claim 1, wherein the color assignment unit comprises color assignment selection means responsive to user input for specifying or changing the assignment of an available color to each pixel based on the luminance level represented by the luminance data of that pixel.

11. The system of claim 1, wherein the output device is a printer for printing on a printing medium, and the plurality of available colors are printable colors defined by material colors provided for printing in the printer, the material colors including colors of ink or heat sensitive colorants, and the color of the printing medium itself.

12. The system of claim 11, wherein the printable colors include halftones that can be created by combining the material colors.

13. A method of processing image data for display or printout by an output device, comprising steps of:

(a) obtaining and storing source data containing a representation in plural colors of an image, a graphic or text;

(b) converting color data of each pixel in the source data to luminance data for that pixel, the luminance data representing one of a plurality of luminance levels; and

(c) assigning one of plurality of colors that are available in the output device to each pixel according to the luminance level represented by the luminance data of that pixel.

14. The method of claim 13, wherein the color data of each pixel is represented by intensity values of primary colors, and step (b) comprises converting the color data to the luminance data by weighting each color intensity value by a weighting factor assigned to that color intensity value, and summing the weighted color intensity values.

15. The method of claim 14, wherein the primary colors are red, green, and blue, and the ratio of the weighting factors is equal or approximately equal to R:G:B = 3:6:1 where R represents red, G represents green and B represents blue.

16. The method of claim 13, wherein step (b) comprises:

(b)(1) converting the color data for each pixel to first luminance data representing one of a first number of luminance levels, and

(b)(2) further converting the first luminance data for each pixel to second luminance data representing one of the plurality of luminance levels, the plurality being a second number smaller than the first number.

17. The method of claim 16, wherein step (b)(2) further comprises:

(b)(2)(i) calculating a luminance distribution by counting for each luminance level of the first number the number of pixels whose corresponding luminance data represents that luminance level;

(b)(2)(ii) detecting one or more luminance levels that represent local pixel count minimums in the luminance distribution;

(b)(2)(iii) setting threshold values based on the one or more minimums; and

(b)(2)(iv) reducing the first number of luminance levels to the second number based on the threshold values.

18. The method of claim 17, wherein step (b)(2)(ii) detects the one or more minimums by scanning the luminance distribution from one of the smallest and the highest luminance level to the other one of these two luminance levels and finding one or more luminance levels at which the pixel count value starts increasing and keeps increasing for a predetermined plurality of consecutive luminance levels, after it had decreased for a predetermined plurality of consecutive luminance levels.

19. The method of claim 17, wherein step (b)(2) further comprises:

(b)(2)(v) smoothing the luminance distribution, and

step (b)(2)(ii) comprises detecting the one or more minimums from the smoothed luminance distribution.

20. The method of claim 13, wherein the plurality of luminance levels is eight.

21. The method of claim 13, wherein the plurality of luminance levels is N, and step (c) comprises assigning to each of the N luminance levels a respective one of N available colors.

22. The method of claim 13, wherein step (c) comprises responding to user input by specifying or changing the assignment of an available color to each pixel based on the luminance level represented by the luminance data of the pixel.

23. The method of claim 13, applied to processing image data for printout on a printing medium by a printer, wherein the plurality of available colors are printable colors defined by material colors provided for printing in the printer, the material colors including colors of ink or heat sensitive colorants, and the color of the printing medium itself.

24. The method of claim 23, wherein the printable colors include halftones that can be created by combining the material colors.

25. A machine-readable medium carrying a program of instructions executable by the machine to perform a method of processing image data for display or printout by an output device, the program of instructions comprising:

(a) instructions for obtaining and storing source data containing a representation in plural colors of an image, a graphic or text;

(b) instructions for converting color data of each pixel in the source data to luminance data for that pixel, the luminance data representing one of a plurality of luminance levels; and

(c) instructions for assigning one of plurality of colors that are available in the output device to each pixel according to the luminance level represented by the luminance data of that pixel.

26. The machine-readable medium of claim 25, wherein the color data of each pixel is represented by intensity values of primary colors, and instructions (b) comprise instructions for converting the color data to the luminance data by weighting each color intensity value by a weighting factor assigned to that color intensity value, and summing the weighted color intensity values.

27. The machine-readable medium of claim 26, wherein the primary colors are red, green, and blue, and the ratio of the weighting factors is equal or approximately equal to R:G:B = 3:6:1 where R represents red, G represents green and B represents blue.

28. The machine-readable medium of claim 25, wherein instructions (b) comprise:

(b)(1) instructions for converting the color data for each pixel to first luminance data representing one of a first number of luminance levels, and

(b)(2) instructions for further converting the first luminance data for each pixel to second luminance data representing one of the plurality of luminance levels, the plurality being a second number smaller than the first number.

29. The machine-readable medium of claim 28, wherein instructions (b)(2) further comprise:

(b)(2)(i) instructions for calculating a luminance distribution by counting for each luminance level of the first number the number of pixels whose corresponding luminance data represents that luminance level;

(b)(2)(ii) instructions for detecting one or more luminance levels that represent local pixel count minimums in the luminance distribution;

(b)(2)(iii) instructions for setting threshold values based on the one or more minimums; and

(b)(2)(iv) instructions for reducing the first number of luminance levels to the second number based on the threshold values.

30. The machine-readable medium of claim 29, wherein instructions (b)(2)(ii) comprises instructions for detecting the one or more minimums by scanning the luminance distribution from one of the smallest and the highest luminance level to the other one of these two luminance levels and finding one or more luminance levels at which the pixel count value starts increasing and keeps increasing for a predetermined plurality of consecutive luminance levels, after it had decreased for a predetermined plurality of consecutive luminance levels.

31. The machine-readable medium of claim 29, wherein instructions (b)(2) further comprise:

(b)(2)(v) instructions for smoothing the luminance distribution, and

instructions (b)(2)(ii) comprise instructions for detecting the one or more minimums from the smoothed luminance distribution.

32. The machine-readable medium of claim 25, wherein the plurality of luminance levels is eight.

33. The machine-readable medium of claim 25, wherein the plurality of luminance levels is N, and instructions (c) comprise instructions for assigning to each of the N luminance levels a respective one of N available colors.

34. The machine-readable medium of claim 25, wherein instructions (c) comprise instructions for responding to user input by specifying or changing the assignment of an available color to each pixel based on the luminance level represented by the luminance data of the pixel.

35. The machine-readable medium of claim 25, applied to processing image data for printout on a printing medium by a printer, wherein the plurality of available colors are printable colors defined by material colors provided for printing in the printer, the material colors including colors of ink or heat sensitive colorants, and the color of the printing medium itself.

36. The machine-readable medium of claim 35, wherein the printable colors include halftones that can be created by combining the material colors.